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# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**Pioneer Hi-Bred International, Inc.**

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT 1930, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'PHK56'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 30th day of August in the year of our Lord one thousand nine hundred and ninety-one.

Attest:

*Kenneth H. Evans*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Robert Lee Segebart*  
Robert Lee Segebart  
App. No. 10/768,338

REF  
A7

Public reporting burden for this collection of information is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Office, OIRM, Room 404-W, Washington, D.C. 20250, and to the Office of Management and Budget, Paperwork Reduction Project (0418-0018-0031), Washington, 20250.

FORM APPROVED: OMB 0581-0015, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE  
(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1 NAME OF APPLICANT(S) (as it is to appear on the Certificate) Pioneer Hi-Bred International, Inc.		2 TEMPORARY DESIGNATION OR EXPERIMENTAL NO.	3 VARIETY NAME PHK56
4 ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) Plant Breeding Division Department of Corn Breeding PO Box 85 Johnston, IA 50131-0085		5 PHONE (include area code) 515/270-3300	FOR OFFICIAL USE ONLY PVPO NUMBER 9000247
6 GENUS AND SPECIES NAME Zea mays	7 FAMILY NAME (Botanical) Gramineae		FILED Date August 28, 1990 Time <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.
8 CROP KIND NAME (Common Name) Corn	9 DATE OF DETERMINATION March 1988		FEES Filing and Examination Fee \$ 2150. Date August 28, 1990
10 IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			RECEIVED Certificate Fee \$ 250 Date July 26, 1991
11 IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa		12 DATE OF INCORPORATION May 6, 1926	
13 NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Dr. Bruce D. McBratney Plant Breeding Division Pioneer Hi-Bred International, Inc. PO Box 85 Johnston, IA 50131-0085 PHONE (include area code): 515/270-3546			
14 CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)			
a <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b <input checked="" type="checkbox"/> Exhibit B. Novelty Statement c <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d <input checked="" type="checkbox"/> Exhibit D. Additional Description of Variety e <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of Applicant's Ownership f <input checked="" type="checkbox"/> Seed Sample (2,500 viable untreated seeds) Date Seed Sample mailed to Plant Variety Protection Office August 24, 1990 g <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States"			
15 DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act) <input type="checkbox"/> YES (If "YES," answer items 16 and 17 below) <input checked="" type="checkbox"/> NO (If "NO," skip to item 18 below)			
16 DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO		17 IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	
18 DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> YES (If "YES," through <input type="checkbox"/> Plant Variety Protection Act <input type="checkbox"/> Patent Act Give date _____) <input checked="" type="checkbox"/> NO			
19 HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> YES (If "YES," give names of countries and dates) <input checked="" type="checkbox"/> NO			
20 The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable. The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF APPLICANT (Owner(s)) Pioneer Hi-Bred International, Inc.		CAPACITY OR TITLE	DATE
SIGNATURE OF APPLICANT (Owner(s)) Bruce D. McBratney		Technical Support Coordinator	8/15/90 1

## 14A. Exhibit A. Origin and Breeding History

Pedigree: PHG47/PHG35)X9312X

Pioneer Line PHK56, Zea mays L., a yellow dent corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross PHG47 x PHG35 using the pedigree method of breeding. The progenitors of PHK56 are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Selfing and selection were practiced within the above F1 cross for six generations in the development of PHK56 at Marion, Iowa. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Marion, Iowa, as well as other Pioneer research stations in the mid-maturity areas of the United States Corn Belt. After initial testing, additional hybrid combinations have been evaluated and subsequent generations of the line have been grown and hand-pollinated with observations made for uniformity.

PHK56 has shown uniformity and stability for all traits as described in Exhibit C - "Objective Description of Variety". It has been self-pollinated and ear-rowed a sufficient number of generations with careful attention paid to uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity.

No variant traits have been observed or are expected in PHK56.

906047

Developmental History for PHK56

<u>Season/Year</u>	<u>Inbreeding Level</u>
Winter 1980	F0 (Cross made)
Summer 1980	F1
Summer 1981	F2
Summer 1982	F3
Summer 1983	F4
Summer 1984	F5
Summer 1985	F6
Summer 1986	F7*
Summer 1987	F8
Summer 1988	F9
Summer 1989	F10**

\* PHK56 was selfed and selected through F7 generation.

\*\* PHK56 was selfed and ear-rowed from F8 through F10 generations.

9000247

Exhibit A: During the early development (F1-F2) of the inbreds, selection was based on agronomic characteristics (e.g., plant height, stalk lodging, disease and insect resistance, etc.) whereas, from F3 through later generations selection was based on yield as well as agronomic characteristics. The most important traits during selection would be those described in the definitions section and in Exhibit D. Yield is looked at on a per se basis and how well an inbred performs in hybrid combination.

900326

14B. Exhibit B. Novelty Statement

PHK56 is most similar to the Pioneer Hi-Bred International, Inc. proprietary inbred line PHW43 (PVP Certificate No. 8900326). PHK56 is earlier in maturity compared to PHW43. PHK56 sheds pollen and silks approximately 50 (1420 versus 1470) and 40 (1460 versus 1500) growing degree units earlier than PHW43. The leaf sheath of PHK56 has more pubescence (medium version light) than PHW43. The silk color of PHK56 is pink, has a horizontal ear shank, and slightly curved kernel rows whereas PHW43 has red silk, an upright ear shank, and straight kernel rows.

9000247

## VARIETY DESCRIPTION INFORMATION

INBRED - PHK56

Type: DENT

Region Best Adapted: Northcentral

## A. Maturity: Average across maturity zones. Zone : 0

Heat Unit Shed: 1420

Heat Unit Silk: 1460

No. Reps: 59

$$\text{HEAT UNITS} = \frac{[\text{Max.Temp. } (<86^{\circ}\text{F.}) + \text{Min. Temp } (>50^{\circ}\text{F.})] *}{2} - 50$$

\* If maximum is greater than 86 degrees fahrenheit, then 86 is used and if minimum is less than 50, then 50 is used. Heat units accumulated daily and can not be less than 0.

## B. Plant Characteristics:

Plant height (to tassel tip): 216 cm  
Length of top ear internode: 12 cm  
Number of ears per stalk: Single  
Ear height (to base of top ear): 82 cm  
Number of tillers: None  
Cytoplasm type: Normal

## C. Leaf:

Color: (WF9) Medium Green  
Angle from Stalk: 30-60 degrees  
Marginal Waves: (OH7L) Many  
Number of Leaves (mature plants): 18  
Sheath Pubescence: (WF9) Medium  
Longitudinal Creases: (PA11) Many  
Length (Ear node leaf): 72 cm  
Width (widest point, ear node leaf): 10 cm



- Page Two -

## D. Tassel:

Number lateral branches: 6  
Branch Angle from central spike: 30-40 degrees  
Pollen Shed: Heavy based on Pollen Yield Test  
(107% of experiment means)  
Peduncle Length (top leaf to basal branches): 25 cm  
Anther Color: Yellow  
Glume Color: Green

## E. Ear (Husked Ear Data Except When Stated Otherwise):

Length: 17 cm  
Weight: 142 gm  
Mid-point Diameter: 42 mm  
Silk Color: Pink  
Husk Extension (Harvest stage): Medium (Barely Covering Ears)  
Husk Leaf: Short (< 8 cm)  
Taper of Ear: Average  
Position of Shank (dry husks): Horizontal  
Kernel Rows: Slightly Curved, Distinct Number = 16  
Husk Color (fresh): Light Green  
Husk Color (dry): Buff  
Shank Length: 16 cm  
Shank (No. of internodes): 8

## F. Kernel (Dried):

Size (from ear mid-point)  
Length: 11 mm  
Width: 8 mm  
Thick: 4 mm  
Shape Grade (% rounds): 20-40 (30% medium round based on Parent  
Test Data)  
Pericarp Color: Colorless  
Aleurone Color: Homozygous Yellow  
Endosperm Color: Yellow  
Endosperm Type: Normal Starch  
Gm Wt/100 Seeds (unsized): 25 gm

## G. Cob:

Diameter at mid-point: 25 mm  
Strength: Strong  
Color: Red

- Page Three -

## H. Diseases:

Corn Lethal Necrosis (MCMV=Maize Chlorotic Mottle Virus and  
MDMV=Maize Dwarf Mosaic Virus): Intermediate  
Anthracnose Stalk Rot (*C. graminicola*): Intermediate  
N. Leaf Blight (*E. turcicum*): Intermediate  
Carbonum Leaf Blight (*H. carbonum*): Susceptible  
Eye Spot (*K. zeae*): Intermediate  
Gray Leaf Spot (*C. zeae*): Intermediate  
Goss's Wilt (*C. nebraskense*): Resistant  
Common Smut (*U. maydis*): Resistant  
Head Smut (*S. reilliana*): Highly Resistant  
Fusarium Ear Mold (*F. moniliforme*): Resistant

## I. Insects:

European Corn Borer-1 Leaf Damage (Pre-flowering): Intermediate  
European Corn Borer-2 (Post-flowering): Susceptible

The above descriptions are based on a scale of 1-9, 1 being  
highly susceptible, 9 being highly resistant.

S (Susceptible): Would generally represent a score of 1-3.  
I (Intermediate): Would generally represent a score of 4-5.  
R (Resistant): Would generally represent a score of 6-7.  
H (Highly Resistant): Would generally represent a score of  
8-9. Highly resistant does not imply  
the inbred is immune.

## J. Variety Most Closely Resembling:

Character	Inbred
Maturity	PHW43
Usage	PHW43

PHW43 (PVP Certificate No. 8900326) is a Pioneer Hi-Bred  
International, Inc. proprietary inbred.

Data for Items B, C, D, E, F, and G is based primarily on a maximum of  
two reps from Johnston, Iowa grown in 1988, plus description information  
from the maintaining station.

90-0247

CLARIFICATION OF DATA IN EXHIBITS C AND D

Please note the data presented in Exhibit C, "Objective Description of Variety," is data collected primarily at Johnston, Iowa plus description information from the maintaining station. The data in Exhibit D, "Additional Description of Variety," is data from comparisons of inbreds or hybrids grown in the same tests in the adapted growing area of PHK56.

### DEFINITIONS

In the description and examples, a number of terms are used herein. In order to provide a clear and consistent understanding of the specification and claims, including the scope to be given such terms, the following definitions are provided:

BAR PLT = BARREN PLANTS. This is the percent of plants per plot that were not barren (lack ears).

BRT STK = BRITTLE STALKS. This is a measure of the stalk breakage near the time of pollination, and is an indication of whether a hybrid or inbred would snap or break near the time of flowering under severe winds. Data are presented as percentage of plants that did not snap.

BU ACR = YIELD (BUSHEL/ACRE). Actual yield of the grain at harvest adjusted to 15.5% moisture. ABS is in absolute terms and % MN is percent of the mean for the experiments in which the hybrid or inbred was grown.

DRP EAR = DROPPED EARS. This is a measure of the number of dropped ears per plot and represents the percentage of plants that did not drop ears prior to harvest.

EAR HT = EAR HEIGHT. The ear height is a measure from the ground to the top developed ear node attachment and is measured in centimeters.

EST CNT = EARLY STAND COUNT. This is a measure of the stand establishment in the spring and represents the number of plants that emerge on a per plot basis for the hybrid or inbred.

GDU SHD = GDU TO SHED. The number of growing degree units (GDUs) or heat units required for an inbred line or hybrid to have approximately 50 percent of the plants shedding pollen and is measured from the time of planting. Growing degree units are calculated by the Barger Method, where the heat units for a 24-hour period are:

$$\text{GDU} = \frac{(\text{Max. temp.} + \text{Min. temp.})}{2} - 50$$

The highest maximum temperature used is 86°F and the lowest minimum temperature used is 50°F. For each inbred or hybrid it takes a certain number of GDUs to reach various stages of plant development.

GDU SLK = GDU TO SILK. The number of growing degree units required for an inbred line or hybrid to have approximately 50 percent of the plants with silk emergence from time of planting. Growing degree units are calculated by the Barger Method as given in GDU SHD definition.

GRN QUL = QUAL. = GRAIN QUALITY. This is a 1 to 9 rating for the general quality of the shelled grain as it is harvested based on such factors as the color of the harvested grain, any mold on the grain, and any cracked grain. High scores indicate good grain quality and low scores indicate poor grain quality.

MST = HARVEST MOISTURE. The moisture is the actual percentage moisture of the grain at harvest.

PLT HT = PLANT HEIGHT. This is a measure of the height of the plant from the ground to the tip of the tassel in centimeters.

RT LDG = ROOT LODGING. Root lodging is the percentage of plants that do not root lodge; plants that lean from the vertical axis at an approximately 30° angle or greater would be counted as root lodged.

SDG VGR = SEEDLING VIGOR. This is the visual rating (1 to 9) of the amount of vegetative growth after emergence at the seedling stage (approximately five leaves). A higher score indicates better vigor and a low score indicates poorer vigor.

STA GRN = STAY GREEN. Stay green is the measure of plant health near the time of black layer formation (physiological maturity). A high score indicates better late-season plant health.

STK LDG = STALK LODGING. This is the percentage of plants that did not stalk lodge (stalk breakage) as measured by either natural lodging or pushing the stalks and determining the percentage of plants that break below the ear.

TST WT = TEST WEIGHT UNADJUSTED. The measure of weight of the grain in pounds for a given volume (bushel).

14D. EXHIBIT D. ADDITIONAL DESCRIPTION OF PK56  
INHERD PER SE YIELD TEST COMPARISON OF PK56 AND FW43 EVALUATED OVER  
THREE YEARS.

		VARIETY #1 - PK56										VARIETY #2 - FW43										* = 10% SIG			+ = 5% SIG			# = 1% SIG																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
YEAR	VAR #	MST		BAR		PLT		EAR		SDG		EST		GDU		SHD		SLK		STA		ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS

YEAR	VAR #	VARIETY #1 - PK56										VARIETY #2 - FW43										* = 10% SIG			+ = 5% SIG			# = 1% SIG		
		MST	BAR	PLT	EAR	SDG	EST	CUU	SHD	SILK	STA	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS
		ABS	ABS	HT	HT	VGR	CNT	SHD	SHD	SHD	GRN																			

9000247

14D. EXHIBIT D. ADDITIONAL DESCRIPTION OF PHK56.  
COMPARISON OF PHK56 AND PHZ51 CROSSED TO THE SAME INBRED LINE AND THE  
HYBRIDS EVALUATED OVER THREE YEARS.

VARIETY #1 - PHK56 HYBRID  
VARIETY #2 - PHZ51 HYBRID

* = 10% SIG    + = 5% SIG    # = 1% SIG																					
YEAR	VAR #	BU ACR ABS	BU ACR WVN ABS	MST ABS	BAR FLT HT ABS	FLT HT ABS	EAR HT ABS	SDG VCR ABS	EST CNT ABS	DRP EAR ABS	CDU SHD ABS	CDU SLK ABS	TST WTA ABS	GRN QUL ABS	STA GRN ABS	STK LDG ABS	RT LDG ABS	BRT STK ABS			
87	1	156.5	101	20.9	98.9	281.4	104.9	5.8	60.3	99.7	1380	56.2	6.8	2.5	91.0	98.4					
	2	164.8	107	20.3	99.3	299.2	137.2	5.8	61.0	99.1	1390	56.1	6.6	4.8	93.9	89.4					
	LOCS	6	6	6	3	3	3	3	3	3	1	6	6	2	6	2					
	PROB	.197	.182	.027+	.384	.045+	.037+	.000#	.656	.205		.671	.768	.323	.504	.416					
88	1	128.5	104	21.3	90.6	224.0	85.6	6.2	58.8	99.8	1392	57.0	6.7	3.4	91.1	94.5					
	2	125.8	103	21.6	89.8	246.1	102.9	5.4	57.7	99.8	1444	57.4	6.7	4.9	94.5	96.3					
	LOCS	39	39	42	8	8	19	19	29	21	12	40	17	23	37	14					
	PROB	.289	.592	.358	.753	.000#	.000#	.025+	.187	.974	.001#	.072*	.889	.000#	.022+	.432					
89	1	157.7	106	19.6	98.6	275.3	113.3	5.4	59.0	99.5	1319	57.2	6.4	4.6	84.2	92.8					
	2	151.5	101	20.0	97.7	296.2	133.8	5.0	56.5	99.2	1345	57.9	6.7	5.7	92.9	93.0					
	LOCS	104	104	105	9	9	39	37	52	68	28	103	94	41	86	54					
	PROB	.002#	.001#	.063*	.507	.000#	.000#	.026+	.000#	.034+	.000#	.239	.000#	.027+	.000#	.831	.971				
TOTAL SUM	1	150.0	106	20.1	95.4	259.3	104.1	5.7	59.0	99.6	1342	57.1	6.5	4.1	86.5	93.3					
	2	145.3	102	20.4	94.8	280.4	124.2	5.2	57.0	99.3	1375	57.7	6.7	5.4	93.4	93.6					
	LOCS	149	149	153	20	20	60	59	83	95	41	149	117	66	129	70					
	DIFF	4.7	4	0.3	0.7	21.1	20.1	0.5	2.0	0.3	33	51	0.6	1.3	6.9	0.3					
	PROB	.002#	.005#	.055*	.547	.000#	.000#	.002#	.000#	.024+	.000#	.016+	.000#	.053*	.000#	.765	.971				
YEAR	VAR #	BU ACR ABS	BU ACR WVN ABS	MST ABS	BAR FLT HT ABS	FLT HT ABS	EAR HT ABS	SDG VCR ABS	EST CNT ABS	DRP EAR ABS	CDU SHD ABS	CDU SLK ABS	TST WTA ABS	GRN QUL ABS	STA GRN ABS	STK LDG ABS	RT LDG ABS	BRT STK ABS			

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14D. EXHIBIT D. ADDITIONAL DESCRIPTION OF PHK56.  
COMPARISON OF PHK56 AND PHJ90 CROSSED TO THE SAME INBRED LINE AND THE  
HYBRIDS EVALUATED OVER TWO YEARS.

VARIETY #1 - PHK56 HYBRID  
VARIETY #2 - PHJ90 HYBRID

* = 10% SIG + = 5% SIG # = 1% SIG																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
YEAR	VAR #			EU			MST			BAR			FLT			EAR			SDG			EST			DRP			GDU			TST			GRN			STA			STK			RT			BRT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS	3MN	ACR	ABS

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14E. EXHIBIT E. Statement of the Basis of Applicant's Ownership

Pioneer Hi-Bred International, Inc., Des Moines, Iowa, is the employer of the plant breeders involved in the development and evaluation of PHK56. Pioneer Hi-Bred International, Inc. has the sole rights and ownership of PHK56.